AmeriWater
The Water Purification Specialists

CLEAN IN PLACE

OPERATION & MAINTENANCE INSTRUCTIONS

MODEL CIP1

Manufactured With Pride
In The USA

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Part Number: 98-0007
Revision: E

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OBJECTIVE

The objective of the Clean In Place (CIP) system is to introduce high pH and low pH membrane cleaners to the AmeriWater RO+ system at low pressure and high velocity. This action removes scale and organic contaminants from the RO+ membranes and improves system performance.

CHEMICALS REQUIRED

AmeriClean A (P/N 37-0004) low pH cleaner for removing inorganic scale and metals from polyamide thin-film composite membranes (1 lb (266 ml) of AmeriClean A powder is required per membrane cleaning). AmeriClean A effectively removes the following foulants:

- Calcium Carbonate
- Calcium Sulfate
- Barium Sulfate
- Strontium Sulfate
- Iron
- Metal Oxides

AmeriClean B (P/N 37-0005) high pH cleaner for removing acid insoluble foulants from polyamide thin-film composite membranes (1 lb (372 ml) of AmeriClean B powder is required per membrane cleaning). AmeriClean B effectively removes the following foulants:

- Silt
- Colloids
- Organics
- Microbiological
- Acid Insolubles
- Mucilaginous Material

WARNING: Wear appropriate eye and skin protection when handling the membrane cleaning chemicals. The cleaners are high and low pH chemicals and may cause severe chemical burns. Read the MSDS for further information.

WARNING: Never allow AmeriClean A and AmeriClean B to mix! Mixing the chemicals will cause an exothermic reaction which may result in serious injury and/or damage to the equipment! Flush the system thoroughly and verify that the pH of the reject water is neutral prior to introducing another chemical!

WARNING: AmeriClean A and B membrane cleaners are for polyamide thin-film membranes only and cannot be used on cellulose acetate membranes.

INSTALLATION

1. Connect the PUMP FEED end of the hose (with the female garden hose thread fitting) to the bottom of the CIP drum. Connect the other end of hose to the CIP Pump Inlet. FIGURE 2 shows the flow direction arrows on the CIP pump inlet and outlet.

2. Verify that the RO+ is turned off.

3. Connect the RO+ Product Water Hose to the Female Garden Hose Thread Fitting on the CIP drum labeled PRODUCT RETURN (FIGURE 1).

4. Connect the RO+ Reject to Drain Hose to the hose barb fitting on the CIP drum labeled REJECT RETURN (FIGURE 1).

5. Connect the RO+ Incoming Tap Water Hose to the male garden hose thread fitting on the CIP Pump Outlet (FIGURE 2).

6. Remove the carbon tank (if applicable) from the RO+ and install the provided jumper fitting. See the RO+ Operation and Maintenance Manual for detailed instructions regarding the removal of the carbon tank.

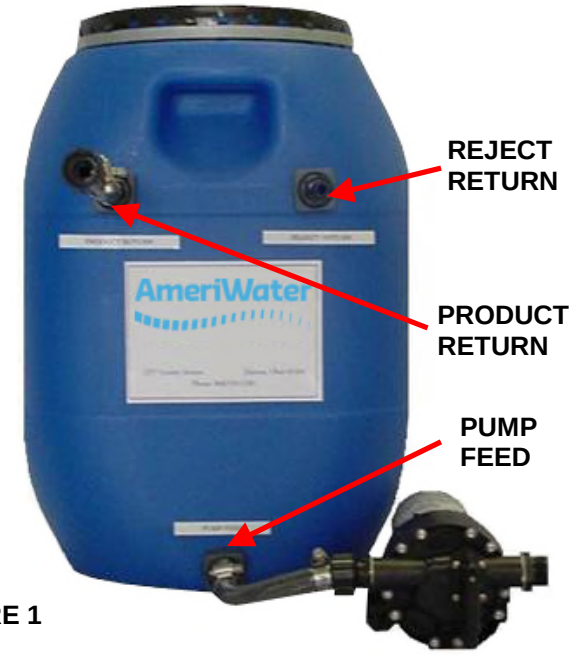


FIGURE 1

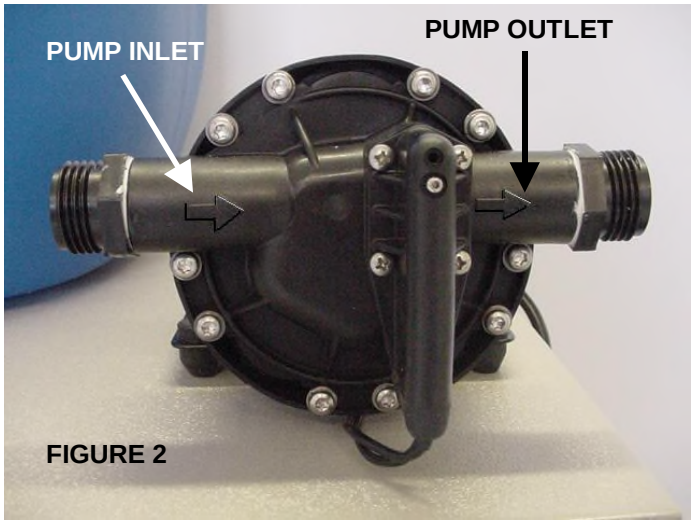


FIGURE 2

7. Place the RO+ FLUSH VALVE in the FLUSH position.

8. Place the Clean-In-Place Switch located on the back of the RO+ controller (if applicable) in the ON position. Reference the RO+ Operation and Maintenance Manual for detailed instructions regarding the Clean-In-Place Switch.

9. Leave the micron prefilter in the RO+ prefilter sump.

HIGH pH CLEANING

NOTE: Be sure to remove carbon block filters (if applicable) from the RO before performing cleaning. Filters will be clogged by cleaning solution if not removed. Sediment filter may remain in the system.

AmeriClean B is used first for the removal of biological and colloidal foulants.

1. Add 10 gallons (~2 inches below the top hose connection) of clean water to the CIP drum (FIGURE 3). RO+ product water or deionized water is recommended if available. Water with a minimum temperature at or near 86° F will provide maximum effectiveness for the high pH cleaner.

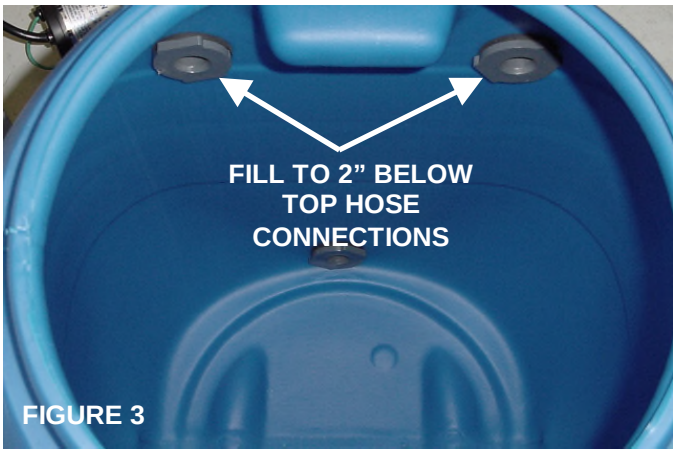


FIGURE 3

2. Slowly add 1 lb (1 full bag) of **AmeriClean B** to the water in the cleaning drum.

3. Agitate the solution until the powder is completely dissolved. **It is important to make sure all of the powder is dissolved before continuing.**

WARNING: Wear appropriate eye and skin protection when handling the membrane cleaning chemicals. The cleaners are high pH and low pH chemicals that may cause severe chemical burns. Read the MSDS for further information.

4. Connect the CIP pump power cord to a 120 VAC receptacle (GFI recommended).

5. Place the Flush Valve in "FLUSH" then turn on the RO+ and verify that the cleaning solution is recirculating and flowing from the drain hose inside the CIP drum.

6. Allow the cleaning solution to recirculate for a minimum of 50 minutes.

   a. Depending on the nature of the fouling, a soak period may be necessary. If the membranes are not heavily fouled, proceed to step 7.

   b. In cases of heavy fouling, turn off the RO and CIP pump and allow the system to soak for a minimum of 30 minutes.*

   * *Contact AmeriWater Technical Support or your local AmeriWater dealer for custom cleaning procedures if necessary.*

c. After the soak time, turn on the CIP pump and RO, and allow the cleaning solution to recirculate again for 30 minutes.

7. Disconnect the pump outlet hose from the CIP drum and direct the hose to a drain. Continue running to drain until the CIP drum is empty (some solution may need to be manually dumped out of the CIP drum).

CAUTION: Neutralization of the spent cleaning solution may be required by local regulations. Verify the requirements of local regulations prior to emptying the cleaning solution into the drain.

8. After removing the spent chemical from the CIP tank, and with the CIP pump discharge directed to drain, turn on the MRO and allow fresh water to flow into and through the RO and CIP system for 10 minutes or until the pH of the water at the pump discharge is neutral (between 6 and 8).

9. Disconnect the pump outlet hose from the CIP and direct it to a drain. Continue running to drain until the CIP drum is empty (some solution may need to be manually dumped out of the CIP drum).

WARNING: Never allow AmeriClean A and AmeriClean B to mix! Mixing the chemicals will cause an exothermic reaction which may result in serious injury and damage to the equipment! Flush the system thoroughly and verify the pH of the reject water is neutral prior to switching chemicals!

NOTE: Under certain conditions the CIP Pump may shut down during recirculation due to thermal overload. In the event that this should occur, disconnect the pump from the power receptacle and allow it to cool for 15 to 30 minutes. After the pump has been allowed to cool, it may be reconnected to the power receptacle and the recirculation continued.

NOTE: The 20” filter housings may trap some left over chemical solution causing rinse out times to be high. To shorten the rinse time, remove and dump the filter housing, then reinstall in the system. This allows the housing to fill with fresh water and reduces time required for rinsing.

LOW pH CLEANING

AmeriClean A is used second for the removal of inorganic scale and metals.

1. Add 10 gallons (~2 inches below the top hose connection) of clean water to the CIP drum (FIGURE 3). RO+ product water or deionized water is recommended if available. Water with a minimum temperature at or near 86° F will provide maximum effectiveness for the high pH cleaner.

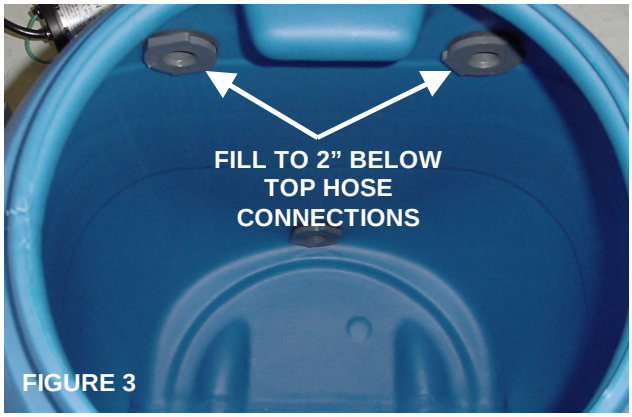


FIGURE 3

2. Slowly add 1 lb (1 full bag) of **AmeriClean A** to the water in the cleaning drum.

3. Agitate the solution until the cleaner is completely dissolved. **It is important to make sure all of the powder is dissolved before continuing.**

WARNING: Wear appropriate eye and skin protection when handling the membrane cleaning chemicals. The cleaners are high and low pH chemicals and may cause severe chemical burns. Read the MSDS for further information.

4. Connect the CIP pump power cord to a 120 VAC receptacle (GFI recommended).

5. Place the Flush Valve in "FLUSH" then turn on the RO+ and verify that the cleaning solution is recirculating and flowing from the drain hose inside the CIP drum.

6. Allow the cleaning solution to recirculate for a minimum of 50 minutes.

   a. Depending on the nature of the fouling, a soak period may be necessary. If the membranes are not heavily fouled, proceed to step 7.

   b. In cases of heavy fouling, turn off the RO and CIP pump and allow the system to soak for a minimum of 30 minutes.*

   * *Contact AmeriWater Technical Support or your local AmeriWater dealer for custom cleaning procedures if necessary.*

   c. After the soak time, turn on the CIP pump and RO, and allow the cleaning solution to recirculate again for 30 minutes.

7. Disconnect the pump outlet hose from the CIP drum and direct the hose to a drain. Continue running to drain until the CIP drum is empty (some solution may need to be manually dumped out of the CIP drum).

CAUTION: Neutralization of the spent cleaning solution may be required by local regulations. Verify the requirements of local regulations prior to emptying the cleaning solution into the drain.

8. After removing the spent chemical from the CIP tank, and with the CIP pump discharge directed to drain, turn on the MRO and allow fresh water to flow into and through the RO and CIP system for 10 minutes or until the pH of the water at the pump discharge is neutral (between 6 and 8).

9. Disconnect the pump outlet hose from the CIP and direct it to a drain. Continue running to drain until the CIP drum is empty (some solution may need to be manually dumped out of the CIP drum).

FLUSH AND RETURN TO SERVICE

1. Disconnect the RO+ Product Water For Dialysis hose, Reject To Drain hose, and Incoming Tap Water hose from the CIP system.

2. Run the RO+ Product Water Hose and the Reject Water To Drain Hose to a drain.

3. Reconnect the carbon tank (if applicable) to the RO+.

4. Install a new micron filter in the prefilter sump on the RO+.

5. Place the CIP Switch located on the back of the RO+ controller in the OFF position (if applicable). Reference the RO+ Operation and Maintenance Manual for detailed instructions regarding the Clean-In-Place Switch.

6. Connect the RO+ Incoming Tap Water hose to a water supply and turn on the incoming water supply.

7. Turn on the RO+ and place the FLUSH VALVE in the FLUSH position. Allow the system to run at this setting for 10 minutes.

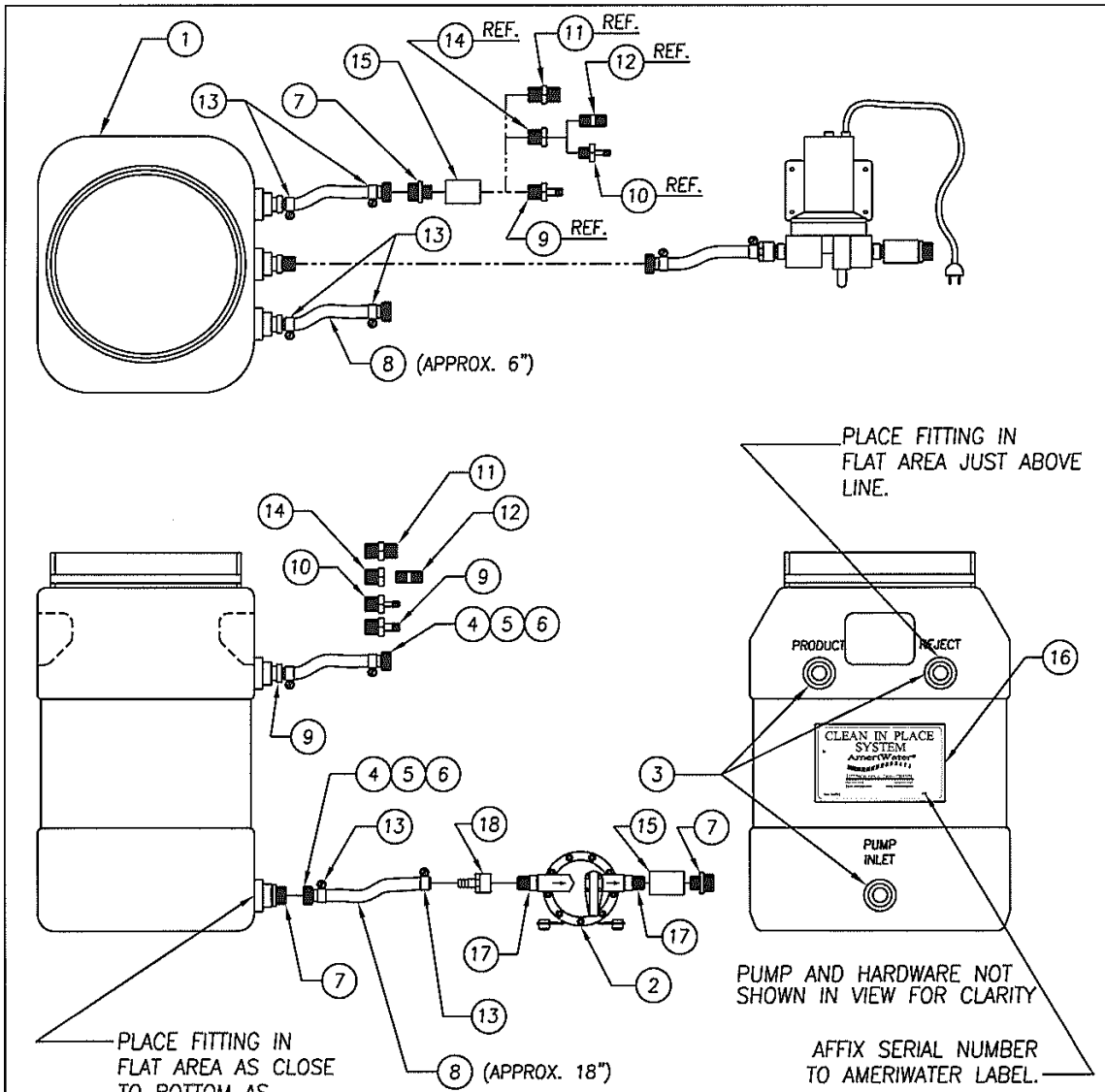
8. Place the FLUSH VALVE in the IN SERVICE or OPERATION position and continue running to drain until the conductivity returns to normal (below setpoint and not in alarm).

9. The RO+ may now be connected to the dialysis machine and returned to service.

WARNING: DO NOT connect the RO+ to the dialysis machine and/or place the RO+ in service until the Product Water conductivity remains below the setpoint and is not in alarm! Serious injury or illness to the patient may result!

SPARE PARTS LIST

Description	Part Number
HOSE BARB, 3/8”MPT x 3/8”HB	14520503
HOSE BARB, 1/2”MPT x 1/2”HB	14520506
FITTING, 3/4”HG INSERT x 1/2”MPT	14570110
WASHER, RUBBER, GH	14570111
FITTING, 3/4”MGHT x 1/2”MPT	046520423
HOSE, 1/2”, MEDICAL SYTLE-5000	12677125
CLAMP HOSE 1/2" SST	15650050
PUMP, AQUATEC, 120VAC, 3.5GPM@50PSI	80-0026
ADPT, AQUAPUMP TO .5MPT	80-0048
ADPT, GH, SWIVEL NUT, PP	14-0014
ADPT, .5FPT x HB, PP	14824002
AMERICLEAN A (Sold in 10 lb case)	37-0004
AMERICLEAN B (Sold in 10 lb case)	37-0005



REV	DATE	DESCRIPTION	INIT
A	22APR03	ORIGINAL ISSUE	KRM
B	220CT03	CORRECTED BOM	KRM

NOTES

1. REFER TO TM#15 DURING TEST AND ASSEMBLY.
2. USE FORM #68 TO RECORD ALL PERTINENT INFORMATION.
3. ALWAYS COMPARE THE WORK ORDER TO ON-HAND DRAWINGS, TEST PROCEDURES, FORMS, AND LAMINATED BOM TO ASSURE THAT LATEST OR CORRECT REVISION LEVEL IS BEING BUILT.
4. ATTACH THE FOLLOWING LABELS AS SHOWN: SERIAL NUMBER, AMERIWATER, PRODUCT, REJECT, AND PUMP INLET.
5. APPLY TEFLON TAPE AND THREAD SEALANT TO ALL THREADED CONNECTIONS. REFER TO P-WKI #17 FOR INSTRUCTIONS.

AWI P/N	ITEM#	QTY	DESCRIPTION
98-0007	19	1	MANUAL, CIP1 (NOT SHOWN)
14824002	18	1	ADPT,.5FPTXHB,PP
80-0048	17	2	ADPT,AQUAPUMP TO .5MPT
99-00CIP1B	16	1	LABEL, CIP1
041530304	15	2	COUPLG,.5,THRD,PVC80
041530224	14	1	BUSH,.5X.38,THRD,PVC80
15650050	13	6	CLAMP,HOSE,.5,SST
041730198	12	1	NIPPLE,.38XCL,PVC80
041610050	11	1	NIPPLE,.5XCL,PVC80
14520503	10	1	ADPT,.38MPTx.38HB,PP
14520506	9	3	ADPT,.5MPTx.5HB,PP
12677125	8	2.5'	HOSE,MEDICAL,.5,STYLE 5000
046520423	7	3	ADPT,MGHTX.5MPT,PP
14-0014	6	3	ADPT,GH,SWIVEL NUT,PP
14570111	5	3	ADPT,GH,WASHER,RUBBER
14570110	4	3	ADPT,GH,SN,INS,.5HB,PP
041531850	3	3	BULKHD,.5,TXS,PVC80,LIGHT DUTY
80-0026	2	1	PUMP,AQUATEC,120VAC,3.5GPM@50PSI
85550601	1	1	TANK 15GAL CAPACITY W/LID

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DRAWN BY: KEN McWILLIAMS		TANK ASSEMBLY & PUMP,CIP1
DATE: 22APR03	SHEET 1 OF 2	MROS THRU MRO2-OLD/NEW
S/O# NA	SCALE: FULL	00CIP1B